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THE
SCIENTIFIC USE OF THE IMAGINATION.

VALEDICTORY ADDRESS

TO THE

GRADUATING CLASS OF THE MEDICAL COLLEGE OF
THE PACIFIC,

NOVEMBER, 1877,

By JOS. H. WYTHER, M.D.,
Professor of Microscopy and Biology.

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THE SCIENTIFIC USE OF THE IMAGINATION.

BY J. H. WYTHE, M.D.

**Valedictory Address to the Graduating Class of the Medical College
of the Pacific.**

Members of the Graduating Class of 1877:

By the appointment of my colleagues in the medical faculty, it becomes my duty to address you on their behalf, and welcome you to the ranks of a profession which is eminently laborious, studious and honorable. For reasons of a personal nature I should have been glad if this duty had been committed to another, yet I realize it to be an honor to act as the representative of your instructors in the various branches of medical science. It is an honor to be associated with gentlemen whose qualities of mind and heart, and whose self-sacrificing labors entitle them to public and private esteem. I consider it also an honor to address you as a class on the present occasion, and thus to have an additional claim upon your memories in the years to come. For many months past we have been associated in the lecture-room, and, by the aid of the microscope and its revelations, have been engaged in unraveling the minute structure of the human frame, tracking the laws of organization to their most secret recesses, classifying the phenomena of life, and tracing the most elementary characteristics of normal and diseased structure. I am glad of the opportunity to give my testimony, in this public way, to your studious pursuit of fundamental truth; to your patience and zeal in research, and to your uniform kindness and propriety of manners. It gives me great pleasure to express for myself, and in behalf of your teachers, our sincere congratulations

for mastered the rudiments of medical science
use an independent course of

study, and are judged worthy of public confidence in the treatment of disease. Be assured that we shall always feel a real interest in your welfare and future success, and shall be pleased to see you rise to the highest positions of respectability and eminence in your chosen profession, and to the enjoyment of an honorable competence in its pursuit.

It is customary, in addresses like the present, to direct attention to some theme of general interest, bearing upon the literature and progress of medicine. But at this point I feel how arduous is the task which has been imposed upon me. So much has been said, and so well said, upon the various topics to which the mind naturally recurs, that it is difficult to find an unexplored territory. The responsibility of physicians, the ethics of the medical profession, the history of the healing art, the importance of preventing disease, the sanitary regulation of our cities and towns, and many other themes of similar import, have been publicly treated in this manner by the ablest men of the profession, so that I come before you as a simple gleaner in fields already well reaped. A few practical thoughts are all I propose to give. I content myself, however, with the assurance that the grains are golden if they are but few, and that they contain a living, germinating principle of truth, which may multiply, under suitable conditions, to future harvests.

As a motto for the present discourse, I present you with a phrase which Professor Tyndall has made classic in our literature: "THE SCIENTIFIC USE OF THE IMAGINATION." I shall not now inquire if the illustrious essayist and experimenter has been careful himself to pursue the path which he has indicated to others, but shall confine myself to a few suggestions respecting the application of the principle to medical knowledge.

Imagination is a term given by writers on mental science to the power which the mind possesses of making images. It is that which gives birth to the productions of the poet and the painter, but it is just as essential to the philosopher and the physician, that they may have a real view of the subjects of their investigations. According to Mr. Stewart, imagination "is not a simple faculty of the mind. It pre-supposes abstraction to separate from each other qualities and circumstances which have been perceived in conjunction; and also judgment and taste to direct us in forming the combinations."

The term Fancy is often used as a synonym for imagination. It would be well if it could be limited to those images, or phantasies, which have no real basis in scientific knowledge, but at the best have only a resemblance to truth. Our language would thus be more exact, and we should not speak of imagination giving

"To nothing
A local habitation and a name;"

while the poet would be strictly accurate who declares that

"When nature rests,
Oft in her absence mimic fancy wakes
To imitate her, but, misjoining shapes,
Wild work produces oft, but most in dreams."

An eminent medical philosopher (*Feuchtersleben, Med. Psychology*) refers to imagination as that operation of the mind by which it receives, retains, recalls and combines, according to higher laws, the ideal images furnished to it by the *coenæsthesia* and by the senses. The first step of this operation is called the faculty of conception; the second, memory; the third, reproductive fancy; and the fourth, productive fancy. The fourth degree of activity, where the imagination appears as productive, or creative, is what we are accustomed to call, in the stricter sense of the word, fancy; and in its spontaneity, poetic power. "It is here that the wonders of the intimate blending of mind and matter are brought to light, and in which the enigma of our mortal existence is peculiarly involved. Beneath this magic circle lies the material world, revealed to the senses; above it the intellectual world, revealed to the mind; and within it the dark or shadowy world of conjecture. While we willingly allow fancy her rights, and recognize them in the region of poetry and in the intellectual life of the mind, let us not be deprived of ours, in the empire of science, and let us visit her domain without suffering ourselves to be touched by the magic wand of this Circé. It is our business calmly to watch her steps, and where we are not able to follow them, faithfully to indicate their traces for the benefit of more fortunate explorers."

The scientific use of the imagination implies that our conceptions have a basis of actual fact, and are controlled by real knowledge. Science means classified knowledge, and nothing can be strictly scientific which is not known to be true. That

which is hypothetical, or unknown, may become a subject of the imagination, or productive fancy, but not of the imagination scientifically used.

I need scarcely argue before this audience that the control of the imagination is essential to a well regulated mind, yet I may be permitted to urge that fundamental truth is necessary to a scientific use of this power. Otherwise, the wildest creations of fancy may be mistaken for philosophical deductions, and the hands on the dial of progress be put far backwards. We regard as childish, if not absurd, the speculations of the ancients respecting the structure of the universe, known as the Ptolemaic system; yet that story was grand, inspiring, and logically consistent with itself. Its error was the fundamental one of an imaginary and unscientific basis. The same may be said of the old medical theory of the animal spirits, and of many other speculations which have filled a large space in the public estimation. It may be questioned whether in our own day, philosophy has not drifted somewhat from scientific Baconian moorings into the ancient sea of fanciful speculation: The tendency to do so is manifest, and the discussion of the causes of such a tendency would be an interesting exhibition of the natural bent of the human intellect. We speculate upon primordial fire-mists, which contain potentially all forms and forces, whether material or mental; on the motion of original vortices, producing successively rings, and satellites, and systems of worlds; and on the identity of all forms of vital and physical force; as if these had been proved to be scientifically true, and we often indulge in elaborate word-building, based upon the creations of our formative imagination, until the airy edifice we erect is as far as possible from sober scientific truth.

I would not deny the value of speculation in furnishing provisional hypotheses. I only claim that such imaginings should be regarded as merely provisional, and not used as unquestionable foundations of philosophic or scientific systems. The field of thought is wide enough, and grand enough, even when limited by that which is actually known, and every year is extending the boundary of real knowledge, so that the most adventurous scientific imagination has room for its excursions.

The great English physiologist, Dr. Carpenter, in his works on *Mental Physiology and Spiritualism*, has shown to what ex-

tent the prevalence of a dominant idea may mislead sincere minds, and become epidemic among great numbers of men. There is no security against such misleading tendencies save by rigidly basing our theories upon actual scientific truth. With an imaginary fulcrum, Fancy can move the world, or the universe, but the result will be illimitable Chaos. Theory piled on theory, as men invented cycles and epicycles in the old philosophy to account for the movements of the heavens, can never lead to elementary truth, or to a knowledge of the actual cosmos.

Professor Schleiden, of Jena, has given us an amusing illustration of this subject. He says: "Some years ago, I was very intimate with the directing physician of a large lunatic asylum, and I used industriously to avail myself of the liberty I thus obtained to visit at will the house and its inhabitants. One morning I entered the room of a madman, whose constantly varying hallucinations especially interested me. I found him crouching down by the stove, watching with close attention a saucepan, the contents of which he was carefully stirring. At the noise of my entrance, he turned round, and, with a face of the deepest importance, whispered: 'Hush! hush! don't disturb my little pigs; they will be ready directly.' Full of curiosity to know whither his diseased imagination had now led him, I approached nearer. 'You see,' said he, with the mysterious expression of an alchemist, 'here I have black puddings, pig's bones and bristles, in the saucepan, everything that is necessary; we only want the vital warmth, and the young pigs will be ready made again.' Laughable as this circumstance appeared to me at the time, it has often recurred to me since in seriousness when I have reflected on certain errors in science, and if the mere form of the delusion were the criterion of sanity or insanity, even many distinguished naturalists of our time would have to share the narrow cell of my unfortunate Mahlberg."

The history of medical science is full of instances of speculations which rest on assumed or unscientific grounds. Under the influence of the Pythagorean philosophy, which taught that fire is the prime origin of all matter, Hippocrates considered fever to be an increase in the original heat, or principle of life, and this conception, variously distorted, was influential in medical theories for nearly 2000 years. The Humoral theory, as it is

called, rested upon the idea that the four elements: fire, air, earth, and water, with the combination of four states or qualities: hot, cold, moist, and dry, gave rise to the four fluids or humors of the body: blood, phlegm, bile, and black bile, which produced the four temperaments, which in their turn tended to the excess or defect of the humors. The Solidists, on the contrary, considered disease as an increase or deficiency of tone in the solid fibres of the body. The Chemical school sought for the essence of disease in a sort of chemical fermentation of the fluids; while the Mechanical school regarded the body as a machine, subject only to physical laws and disease, as derangement in the system of tubes, etc., of which it is composed. The Homeopathists consider diseases and remedies to be dynamical, whatever may be meant by that term, and claim that this power is increased in remedies by trituration and dilution. The Brunonian system traced all diseases to increased or defective irritability. Broussais fixed upon irritation of the intestinal canal as the starting point of variously complex symptoms. Later still, fever has been considered a purely chemical process from the increased rapidity of combustion in the capillaries, while the present tendency is to locate all fever-exciting causes in the vaso-motor and excito-caloric centers in or just above the medulla oblongata.

Such theories rest upon assumptions more or less probable, according to the state of science existing at the time, but they can hardly be claimed as scientific. Most of them regard disease as something foreign to the organism, but which is forced upon it—some particular entity which assails us, but which has never been revealed to science.

It is the glory of modern medicine, that while it does not utterly condemn all theorizing, it teaches that it can only be provisional, and that all important progress must rest upon actual discoveries. Up to the present time nothing has so far penetrated towards a scientific knowledge of the seat and causes of disease as the study of normal and pathological histology in connection with physiology and clinical observation. Such investigations have taught us that morbid phenomena do not differ essentially from normal phenomena, since each morbid manifestation has its analogue in physiological conditions. They have taught us also that there are no specific pathological

forms. It was formerly thought that peculiarly formed cells existed in tubercle, sarcoma, and cancer, but the microscope has proved this to have been a mistake. "There is no radical difference between the forces and substances by means of which normal and morbid life is preserved; no important difference between physiological and pathological laws. The difference lies in the conditions under which the forces and substances of the body operate." (*Wagner's Gen. Pathology.*) Thus the work of the physician is removed from the sphere of speculation to the modification of the conditions of morbid life. The progress of experimental therapeutics is constantly furnishing us with agencies, some of them of great power, by which such modifications may be realized, so that it is not too much to assert that medicine is rapidly acquiring the character of an exact science. There will be no need for you to draw upon your imagination for facts, if you pursue with ordinary industry the methods indicated by your previous studies. I hazard nothing in saying that the unscientific use of the imagination is the prolific source of all heresy, and of all quackery, in medicine, in philosophy, and in religion. The magnetic baths of Mesmer, Perkins' metallic tractors, the dynamic force of infinitesimal doses of medicine, the old Grecian cosmogonies and their revival in modern times, electro-biology, and spiritualism, with a host of similar speculations and delusions, have no other foundation. Such theories may sometimes be found associated with facts, since some truth may exist in the wildest scheme of error ever imagined. The fatal objection to them all is their foundation on fancy instead of truth.

It is astonishing to see with what tenacity the disposition to forsake the sober walks of experimental truth for the shadowy realms of mystical imagination clings even to tolerably well educated men. Some time ago it was my privilege to visit the leper asylum in the Sandwich Islands, and on my return I gave a report of my observations in a medical society. At the close of my remarks a prominent physician, a man of general culture, expressed dissatisfaction with my report, since I had not demonstrated microscopically, and brought to the society for exhibition the *materies morbi*. As if there was any morbid material! As if such phenomena were not due to the perversion of normal structure and function! The objection reminded me of the old

notion of Paracelsus, that fever was caused by the burning of sulphur and saltpeter in the veins.

While I repudiate the unscientific use of the imagination, or fancies respecting scientific matters which are not founded upon actual knowledge, I would not have you undervalue imagination, or its scientific use. When you are called upon to examine and prescribe for a case of disease, you will find it essential to imagine, or form a picture in your mind, of the true condition of the part affected, of the probable termination of the case, and of the modifications you may produce by varying the conditions of vital activity. The first we call diagnosis; the second, prognosis; the third, treatment. Imagination is essential to all these, but let us be sure that it is imagination under the control of a will disciplined in scientific methods, and regulated by actual truth. Be in no hurry to form an opinion. Inquire patiently into every aspect of the case. Let positive symptoms point out the pathological structure or diseased function, and make the knowledge of such derangements the basis of your mental conception. In the solution of your plan of treatment be rationalistic rather than empirical, yet do not despise what has proved efficacious because the reason of its efficacy is not apparent. One fact, in medicine or any other science, is worth a thousand theories. It is the physician's business to heal the sick, if that be possible, and if it is not possible, to lessen suffering and prolong life. Nothing but actual knowledge can guide to such offices. Let me urge you, therefore, to continue the studies you have so well begun. Let others speculate, if they will, respecting the various schools, as they are called, or rather systems, of medical philosophy, but let no exclusive dogma win your adherence. Pursue industriously the plain but sure path of sober, inductive science, and garner carefully the results of your own experience or that of others. In this way your imagination, trained to real use, will serve you well in the investigation and treatment of disease. You will be astonished also to find how readily this Pegasus in scientific harness will conduct you to the true goal. With a flash, almost as of inspiration, you will perceive the nature of the case before you, and often the entire system of means to be employed. If you take off the harness of science there is no telling where the

mettlesome steed may bear you, but you may be sure it will not be on *terra firma*. He loves to scrape the sky too well for that.

In conclusion, I desire to speak in a more general way respecting the profession with which you are now identified. I would describe, if I could, the ideal physician. The physician is a minister to human need in the time of greatest suffering and of greatest danger. His acts and words, and even the transient expressions of his countenance, are not only closely scrutinized, but have an immense influence. Through the windows of his soul nothing but the light of truth should ever shine. If he is worthy of the name he bears, he employs his talents, his study, his time and his best efforts, for the good of others. He is deterred by no obstacle, and shrinks from no danger, and spares no pains to save life or relieve suffering. He should have a sound mind in a sound body. An eagle's eye, a lady's hand and a lion's heart, was the old description of a good surgeon; but these are not possible to a shattered bodily frame. Every habit of life, therefore, which impairs the bodily vigor, is laid aside by him who would excel in his profession. Especially will he refrain from that most seductive vice of artificial stimulation, which has ruined so many brilliant minds. He will cultivate also a polished manner of address, and exercise the courtesies of a gentleman on all occasions. As society is now constituted, nothing but well-known conscientious scruples, an established character for eccentricity, or extraordinary eminence, will be regarded as a palliative for rudeness, vulgarity or profanity. Our ideal physician is also a man of general information. His qualifications in the healing art will be rightly judged of by his proficiency in this respect. The various studies of his profession imply general knowledge as a foundation. As a man of liberal education, he is supposed to be acquainted with the leading facts and principles in science, literature, philosophy and the arts. Gross ignorance of these things will, as a general rule, be considered an evidence of neglect or idleness, and consequent incapacity.

His intellect should be clear and not mystical, nor easily mystified. He should be accustomed to take a comprehensive or bird's-eye view of every subject he contemplates; have delicate esthetical perception, so as to be able to detect the least

want of harmony or proportion; and be of sound practical judgment, that he may draw correct inferences.

As to his professional knowledge, he should consider not what is old, nor what is new, but simply what is true. To attain this knowledge of truth, he keeps fresh in his mind the fundamental principles of anatomy, physiology and chemistry, and constantly applies them to his therapeutics and practice. He keeps fully abreast with the researches and discoveries of others, and spares no pains to provide himself with the means of testing their truth. With him science and experience go hand in hand, and before them disease, and often death, retire.

His heart is warm and full of courage, yet tender, sympathetic, generous, and above all, religious. He is incapable of a mean action. He acts under a sense of responsibility to his Creator. He is influenced by love to God and charity to all mankind. Knowing that his best efforts will be fruitless without the blessing of heaven, he neglects not to ask divine assistance for his professional as well as private duties.

Such, gentlemen, is my ideal of a good physician. Such have often shed luster on our profession. With untiring industry, unostentatious charity and unaffected piety, such men have lived on earth to bless mankind, and have been followed to the skies with the benedictions of all who knew their worth. Let us follow such examples, and we shall have the satisfaction to know that we have not lived and labored in vain.

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